at times. I began to watch for the return of the Leonids at 15h. 30m., but there were many clouds until about 16h., when the firmament cleared and remained nearly cloudless until 18h. During the 2½ hours I counted 29 shooting-stars, and of these 17 were Leonids; so that the shower was pretty conspicuous. The radiant-point was at 149° + 22°, which is almost identical with the place assigned to it in previous years.

The display was noteworthy for the brilliancy of the individual meteors. I observed a large Leonid fireball at 16h. 56m., and I also saw two Leonids equal to Jupiter and one first magnitude at other times. Their paths were as follow:—

	h.	m.		°	°		°	°
Nov. 13 ...	16	41 ...	♃ ...	166	+ 34	to	172	+ 37¼
	16	56 ...	Fireball ...	125½	− 22	to	121	− 30½
	17	19 ...	♃ ...	252	+ 33½	to	257½	+ 31
	17	46 ...	1 ...	175	+ 66½	to	210	+ 75½

All these left bright streaks enduring for several seconds. The fireball at 16h. 56m. was situated very low in the southern sky, and I should not have seen it but for its brilliant flashes, which lit up the whole sky with unusual vividness. It must have been a splendid object in the English Channel and at stations in the north-west parts of France. The fine meteor at 17h. 19m. appears to have been seen also by Mr. Backhouse, at Sunderland. At Bristol it was observed near ε Herculis, and very close on the north-east horizon; at Sunderland it was projected near Arcturus, about 15° above the east-by-north horizon, and the most remarkable feature of its display at Sunderland was the durableness of the streak, which continued visible to the naked eye *nine minutes* after the flash which accompanied the outburst of the meteor. A comparison of the observations shows that this bolide at its disappearance was about 37 miles in vertical height above point in the North Sea near lat. 55¼° N., long. 3° E.

The recent shower appears to have been decidedly brighter than any other return of the same stream since 1879, when there occurred a very similar display to that which has just been witnessed. There was a large proportion of fine meteors from the Leonid radiant on November 13 of that year, and this seems a characteristic element of the shower.

Mr. Backhouse obtained observations at Sunderland which amply confirm those at Bristol during the apparition of 1888. He says the Leonids were "unusually numerous" on November 13. Between 16h. 48m. and 18h. 14m. he noticed about 14 of them, including one fireball, one equal to Jupiter, two equal to Sirius, and one equal to a first magnitude star. The streaks of the larger meteors belonging to this system are very pronounced in their aspect, and they sometimes brighten up considerably a few seconds after the nuclei have died away.

It is probable that this well-known group will become increasingly active every year until its maximum in 1899.

Bristol, November 17. W. F. DENNING.

NOTES.

WE understand that Prof. Ray Lankester is a candidate for the post of Deputy-Professor of Human and Comparative Anatomy in the University of Oxford, which has just been created in consequence of the continued illness of Prof. Moseley.

PROF. GIARD'S lectures at the Sorbonne begin to-day. He is to deal with the general proofs of the doctrine of evolution.

IT is expected that the meeting of the International Congress of Anthropology and Prehistoric Archæology, at Paris, in 1889, will be a great success. The Congress was founded at Spezzia in 1865, and held its first session at Neuchâtel in 1866. Many members have already announced their intention of being present at the Paris meeting.

AT the ordinary meeting of the Institution of Civil Engineers, on Tuesday, November 13, the President, Sir George B. Bruce, announced that Lord Armstrong, C.B., Past-President, in the belief that the Benevolent Fund attached to the Institution was not adequately supported by the general body of members, and that it needed support, had most generously offered to contribute any sum not exceeding £5000, provided the members among them would raise a similar amount.

AT a recent meeting of the Edinburgh International Exhibition Association, the joint Committee appointed by the Association and the executive to consider the best way of disposing of the Exhibition surplus submitted its report. The Committee, among various other proposals, recommended that £1000 should be given to the Scottish Meteorological Society in aid of the Ben Nevis Observatory, and £100 to the Royal Scottish Geographical Society.

A RESOLUTE effort is about to be made to secure for North London (comprising the boroughs of Finsbury, Hackney, Islington, and St. Pancras) four great technical institutes. The Central Executive Committee has issued a circular, pointing out the need for these institutions, and appealing for funds. It is supposed that if £200,000 can be raised by private subscriptions a like sum will be contributed by the Charity Commissioners.

THE next course of Christmas lectures adapted to a juvenile auditory will be given, at the Royal Institution, by Prof. Dewar, F.R.S., the subject being "Clouds and Cloudland." They will begin on December 27. During the recess the staircases leading from the gallery of the theatre have been considerably altered in order to facilitate more speedy egress.

WE have already called attention to the fact that an effort is being made to secure for Bedford College (for ladies), York Place, Baker Street, London, new chemical and physical laboratories. The College has been among the most successful of the institutions which send up graduates to the science degrees at the University of London; but its students have hitherto been severely handicapped by the inadequacy of the laboratory accommodation. The opportunity has occurred of securing fresh building-ground adjoining the College, and plans have been prepared for the proposed additional laboratories. The offer must be definitely made before Christmas, and the estimated expenditure will be at least £3000. The Council do not feel warranted in going forward unless they have at least a considerable portion of this sum promised, for which they are entirely dependent on voluntary contributions. Subscribers' names will be received by the lady-resident at the College. An application for assistance is also being made to the City Companies. Bedford College is the only institution exclusively for ladies which provides first-class practical instruction of this kind.

THE work of the United States Fish Commission during the past season seems to have been even more than usually successful. Stations capable of hatching four hundred million codfish-eggs have been established at Gloucester and Wood's Holl; and, according to *Science*, these stations will probably put at least one-fourth of that number of cod-fry into the Atlantic Ocean during the present season. It is expected, therefore, that codfish will soon be more plentiful on the coast of New England than they were years ago, and that a lost industry worth millions of dollars will be restored to that part of the United States.

THE Committee on Science and the Arts, of the Franklin Institute, of Pennsylvania, wishes to make known the fact that it is empowered to award, or to recommend the award of, certain medals for meritorious discoveries and inventions which tend to the progress of the arts and manufactures. These medals are:—(1) The Elliott Cresson Medal (gold), founded by the legacy of Elliott Cresson, of Philadelphia, and conveyed to the Trustees of the Franklin Institute. By the Act of the Institution, May 17, 1849, the Committee on Science and the Arts was designated and empowered to award this medal, and the Committee decided to grant it, after proper investigation and report by a sub-committee, either for some discovery in the arts and sciences, or for the invention or improvement of some useful machine, or for some new process, or combination of materials in manufactures, or for ingenuity, skill, or perfection in workmanship. (2) The John Scott Legacy Premium and Medal (twenty dollars and a medal of copper), founded in 1816, by John Scott, a merchant of Edinburgh, Scotland, who bequeathed to the city of Philadelphia a considerable sum of money, the interest of which should be devoted to rewarding ingenious men and women who make useful inventions. Upon request made to the Secretary of the Franklin Institute, full information will be sent respecting the manner of making application for the investigation of inventions and discoveries; furthermore, the Committee on Science and the Arts will receive and give respectful consideration to reports upon discoveries and inventions which may be sent to it with the view of receiving one or the other of the above-named awards. Full directions as to the manner and form in which such communications should be made, will be sent on application.

THE late Prof. Edward Tuckerman made a choice collection of books and papers relating to lichens, some four hundred numbers in all. These works have been presented by Mrs. Tuckerman, in accordance with her husband's wish, to Amherst College Library; and it is proposed to keep the collection by itself under the name of the "Tuckerman Memorial Library," and to render it worthy of the name by making it as complete as possible in its own department. Some persons interested in this specialty may like to assist in maintaining and completing the collection, on the understanding that it shall always be available to public use. Mr. Wm. I. Fletcher, the Librarian of Amherst College, has therefore issued a notice to the effect that he will be glad to receive contributions, either in money or in material (especially rare monographs that may have escaped Prof. Tuckerman's notice), to this memorial to an eminent scholar and man of science. Whatever money may be contributed will be kept as a fund of which only the income will be employed in making additions to the collection, or in repairs and rebinding. The sum of 1000 dollars would probably suffice as such a fund.

AT the meeting of the Scientific Committee of the Royal Horticultural Society on November 13, Mr. Henslow showed specimens of several species of plants which are propagated by cleistogamous flower-buds. By that means, while retaining a dwarf habit, they are able to multiply very rapidly, and to extend over considerable areas in a tennis-lawn. Although none of them are perennials, they remain so reduced in size that they are not exterminated by the mowing-machine periodically cutting them down. The result is that each species has more or less completely covered certain patches of ground, to the almost entire exclusion of everything else. The plants in question are *Cerastium glomeratum*, *Montia fontana*, *Trifolium procumbens*, *Sagina procumbens*, *Alchemilla arvensis*, *Veronica arvensis*, and *Poa annua*. Mr. Henslow added that he had observed, many years ago, *Trifolium subterranean* flourishing in the same way on the close-cut grass in Kew Gardens, on the site of the present rockery.

EARTHQUAKES occurred at Vyernyi on October 30, at 6 a.m.; at Digne, in the Department of the Lower Alps, on November 1, at 1.36 a.m.; in Sikkim on the 9th inst.; and in various places in California on the 19th inst.

ON the night of Saturday, November 3, about 8 o'clock, the tens of thousands of sheep folded in the large sheep-breeding districts north, east, and west of Reading were taken with a sudden panic, jumping their hurdles, escaping from the fields, and running hither and thither. Early on Sunday morning the shepherds found their animals under hedges and in the roads, panting as if they had been terror-stricken. Messrs. Oakshott and Millard, who write to us on the subject, suggest that a slight earthquake may have been the cause of this strange incident.

THE third general meeting of the Italian Meteorological Society was held at Venice, from September 14 to 21, in the Institute of Music of Benedetto Marcello. Reports of the various papers read are being published in the *Bollettino Mensuale* of the Society. There were discussions on various questions connected with general meteorology and climatology; meteorology applied to hygiene, and hydrology; and geodynamics.

A SUMMARY of the results of two interesting papers read by General Strachey at the recent meeting of the British Association on the meteorology of the Red Sea and Cape Guardafui, prepared from data collected by the Meteorological Office, is contained in the Proceedings of the Royal Geographical Society for November. In 1882 the Admiralty called attention to the precautions necessary in rounding Cape Guardafui from the southward, wrecks having frequently occurred in foggy weather and at night-time, owing to vessels being out of their reckoning from the great variation in the drift of the currents. The paper shows that, although not always infallible, the change of sea temperature in approaching the land is of great assistance in determining the position when near this dangerous coast. The late Captain Symington called attention to this important fact in 1880.

THE Meteorological Office of the Argentine Republic, which was established at Cordoba by Dr. Gould fourteen years ago, and to which we are chiefly indebted for our knowledge of the climate of this vast region, continues to follow the same useful lines under its present Director, Mr. G. G. Davis. Volume vi. of the *Anales*, recently published, contains exhaustive discussions on the climate of five places, from as long a series of observations as was available in each case. The observers are supplied with verified instruments, and the stations are regularly inspected. Several new stations have been established in the more remote districts.

MOST ornithologists have hitherto been of opinion that birds during their yearly migrations never cross the Caucasus chain of mountains, and that on their way towards the north, and on their return, they take the route *viâ* the shores of the Black Sea or of the Caspian. It appears, however, from recent observations made by M. Rossikoff, and communicated to the *Caucasus* newspaper, that such is not the case. On October 9, while on the banks of the Aragva, close by the Ananur station, he saw a number of large birds on the summit of the Tsikhes-dziri Mountain, and they proved to be a flock of some 100 to 150 white storks (*Ciconia alba*), which were crossing the Caucasus chain on their return journey. It appeared also from information gathered from the inhabitants that cranes, herns, and ducks have been often seen in that part of the main chain on their migrations.

TWO new crystalline compounds of arsenious oxide with sodium bromide and sodium iodide have been prepared by Prof. Rüdorff, of Charlottenburg. They form two additional members of an interesting isomorphous group discovered two years ago by Prof. Rüdorff, having the general formula $MX + 2As_2O_3$, where M may be potassium, sodium, or ammonium, and X represents chlorine, bromine, or iodine. In his former memoir, published in 1886, the following members of the series are described, and accurate analyses given:—$KI + 2As_2O_3$, $KBr + 2As_2O_3$, $KCl + 2As_2O_3$, $NH_4I + 2As_2O_3$, and $NH_4Br + 2As_2O_3$. These five salts are beautifully isomorphous, forming hexagonal prisms with rhombohedral terminations, almost undistinguishable from each other on account of their extreme similarity. The two new compounds just announced in the current *Berichte* are the sodium compounds $NaBr + 2As_2O_3$ and $NaI + 2As_2O_3$. The former was obtained by dissolving 20 grammes arsenious oxide and 120 grammes sodium bromide in 350 c.c. boiling water, filtering the somewhat turbid liquid thus obtained, and allowing the clear solution to cool very slowly. On suspending in it a plate of cold glass, crystals of the compound were immediately deposited upon it, which proved on microscopic examination to consist of the hexagonal prisms common to the whole series. The crystals were then washed upon the large glass plate with cold water, dried superficially between filter-paper, afterwards at 130°, and submitted to analysis. The numbers obtained indicate the formula given above. The crystals, as in the case of many other double compounds, are decomposed into their constituents by contact with warm water. The second compound, $NaI + 2As_2O_3$, was similarly obtained, using 60 grammes sodium iodide, 22 grammes arsenious oxide, and dissolving them in half a litre of hot water. On allowing a glass plate to stand twenty-four hours in the solution, it was found to be covered with six-sided prisms, apparently identical in shape with those of the other compounds of the series previously obtained. It is interesting that both these compounds can be readily obtained by the addition of a sufficient quantity of bromide or iodide of sodium to a solution of sodium arsenite. The corresponding compound with chloride of sodium has not yet been prepared. Thus another series of analogous salts is added to the list of isomorphous groups, the number of which is steadily increasing. These groups are of especial interest to the crystallographer, inasmuch as they appear likely to be of invaluable assistance in our attempts to grasp the fundamental problem, "Why does a definite chemical compound crystallize in any particular system?"

THE County of Middlesex Natural History and Science Society has issued its Transactions during the session 1887-88. The volume includes, besides an abstract of an introductory address by Dr. Archibald Geikie, papers on subjects of scientific interest by Prof. Flower, Mr. W. Lant Carpenter, Dr. Sydney T. Klein, and others.

THE new number of the Journal of the Anthropological Institute (vol. xviii. No. 2) is one of great interest. Mr. Galton offers some suggestive remarks on replies by teachers to questions respecting mental fatigue, and Mr. J. Venn has a careful paper on "Cambridge Anthropometry." In a paper on the races of the Babylonian Empire, Mr. G. Bertin sets forth some conclusions which are so different from, and even opposed to, "accepted notions," that he hesitated a long time, he says, "before surrendering himself to the evidence."

DR. H. TEN KATE, in a letter to *Science*, expresses dissent from the opinions lately set forth by Dr. Daniel G. Brinton, as to "the alleged Mongolian affinities of the American race." Dr. Brinton holds that there are no such affinities, whereas to his opponent it seems obvious that the native race of America cannot be properly understood without reference to the Mongolians. Summing up his views on the subject, Dr. H. Ten Kate says:—"I wish to say that Dr. Brinton's argumentation against the affinity between Americans and Mongolians is based upon entirely wrong reasoning. If the reasons he gives were correct, then the classification of the other races of the human species would be equally wrong; for in each of them peoples are grouped together, which, although related by physical characteristics, are linguistically and ethnologically entirely different from each other, not to speak of the difference in their psychological and social evolution. When I admit that the native Americans are Mongoloids, I do not necessarily imply that America has been populated from Asia or elsewhere. However, if we accept the theory of evolution, this is the most probable explanation of the observed facts. But, leaving the doubtful origin of the Americans, and of their languages and arts, out of the question, I maintain that there is a physical similarity, racial affinity, and relationship between the indigenous Americans and the Mongolians in the widest sense. This is, in the present state of anthropological knowledge, an undeniable fact. He who denies it does not believe in physical anthropology; and not to recognize this branch of science is equal to denying natural history in general."

IN the last Administration Report of the Island of Dominica, which has just been laid before Parliament, the President estimates the original Carib population at about three hundred, or something under that figure. The children are healthy, and the numbers of Caribs, according to their own accounts, are not decreasing, but they are gradually becoming so intermixed with the Negroes that the pure Carib, "Franc Carib," will soon be non-existent. The Carib quarter, a reserve of large extent on the Windward side of Dominica, is wholly occupied by them. They are very peaceable and retiring; they live on vegetables and fruits, which they cultivate, and on fish. They keep their roads in good order. Their children appear to be very intelligent, but there is no school in the Carib quarter, though the people are very anxious to have one.

A SOCIETY has been formed in France, under the patronage of many men of high scientific and political standing, for the purpose of developing a proper system of physical education. The leader of the new movement, is M. Philippe Daryl, *alias* Paschal Grousset, who, when a very young man, took an active part in the Paris insurrection of 1871. He afterwards lived in England, whence he sent interesting letters to the *Temps*.

THE *Madras Mail* says that Dr. Thurston, the Superintendent of the Madras Museum, has been requested by the Board of Revenue to visit various electrical establishments in Europe in order to select an electric globe light to shine in twenty fathoms of water. Such a light has long been wanted at the pearl fisheries, for, up to the present, the work of the fisheries has been confined to banks situated at a less depth than twenty fathoms.

THE next *conversazione* of the Royal Microscopical Society will be held on Wednesday, the 28th instant, at 8 o'clock.

THE additions to the Zoological Society's Gardens during the past week include a —— Monkey (*Cercopithecus* sp. inc.) from South Africa, presented by Mr. L. B. Lewis; an Indian Antelope (*Antilope cervicapra* ♂) from India, presented by Mr. J. W. Shand-Harvey; a Himalayan Bear (*Ursus tibetanus* ♀) from Northern India, presented by the Regiment of the 2nd Life Guards; an Axis Deer (*Cervus axis*) from India, presented by Lady Donaldson; a Roseate Cockatoo (*Cacatua roseicapilla*) from Australia, presented by Mrs. Wood; two American Bitterns (*Botaurus lentiginosus*) from North America, presented by Mr. J. B. Williams; a Peregrine Falcon (*Falco peregrinus*), captured at sea, presented by Mr. R. H. Armstrong; a Spotted Salamander (*Salamander maculosa*), European, presented by Mr. F. E. B. Roper, F.Z.S.; two Swans (*Cygnus olor* ♀ ♀), European, a Royal Python (*Python regius*) from West Africa, deposited; two Golden Plovers (*Charadrius pluvialilis*), British, purchased.

OUR ASTRONOMICAL COLUMN.

THE BRAZILIAN TRANSIT OF VENUS EXPEDITIONS, 1882.—We have received vol. iii. of the "Annaes do Imperial Observatorio do Rio de Janeiro," containing the reports of the